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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/743,644	03/05/2001	Hiroyuki Mizukami	112780-020	5738
24573	7590	01/28/2004	EXAMINER	
BELL, BOYD & LLOYD, LLC PO BOX 1135 CHICAGO, IL 60690-1135			ALEJANDRO MULERO, LUZ L	
			ART UNIT	PAPER NUMBER
			1763	

DATE MAILED: 01/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/743,644

Applicant(s)

MIZUKAMI ET AL.

Examiner

Luz L. Alejandro

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 and 7-12 is/are pending in the application.
- 4a) Of the above claim(s) 2-4 and 9 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 5, 7-8 and 10-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 09/02/03 has been entered.

Drawings

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: reference number 7 (see fig. 8). A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

The proposed drawing correction and/or the proposed substitute sheets of drawings, filed on 1/13/03 have been disapproved because the above drawing objection was not overcome. A proper drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance.

Note that if applicant overcomes the above drawing objection by amending the specification, as to include reference number 7, then the drawing correction filed on 1/13/03 will be approved. However, if applicant overcomes the above drawing correction by deleting reference number 7 from fig. 8, then a new drawing correction should be submitted including both the changes made in the correction of drawings filed on 1/13/03 and also the correction of fig. 8 showing the deletion of reference number 7.

Specification

The disclosure is objected to because of the following informalities: the phrase "by providing the" at page 7-line 18 is repeated. At page 28-line 7 and page 30-line 20, the word -- foregoing -- has been misspelled. Also, everywhere in the specification, including in the Brief Description of the Drawings, "Fig. 2" should read -- Fig. 1 --, "Fig. 3" should read -- Fig. 2 --, etc., since Fig. 1 was cancelled.

Appropriate correction is required.

A substitute specification excluding the claims is required pursuant to 37 CFR 1.125(a) because the amendments made in the specification (pre-amendment A and/or any amendment made to correct the informalities mentioned in this office action) could lead to confusion and mistake during the issue and printing processes. Accordingly, the specification is required to be rewritten before passing the case to issue. See 37 CFR 1.125 and MPEP § 608.01(q).

A substitute specification filed under 37 CFR 1.125(a) must only contain subject matter from the original specification and any previously entered amendment under 37

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CFR 1.121. If the substitute specification contains additional subject matter not of record, the substitute specification must be filed under 37 CFR 1.125(b) and must be accompanied by: 1) a statement that the substitute specification contains no new matter; and 2) a marked-up copy showing the amendments to be made via the substitute specification relative to the specification at the time the substitute specification is filed.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1, 5, 7-8 and 10-12 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification as originally filed fails to provide support for the newly added limitation of the electrodes being disposed for not disturbing the plasma flow.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 5, 7 and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Canon, JP 63-255373 in view of Hitomi et al., JP 3-158469 and Takahiro et al., JP 63-286570.

Canon shows the invention substantially as claimed including a surface treatment apparatus for generating plasma by plasma generating electrodes 18 in a casing having said plasma generating electrodes, a raw gas inlet 11 and a substrate supporting table 10; the casing is partitioned into two chambers, a plasma generating chamber provided with the plasma generating electrodes and a substrate processing chamber provided with the substrate supporting table; the substrate processing chamber communicates

with the plasma generating chamber through at least one plasma vent 20 having an orifice or nozzle shape; high frequency electric power source 2b is coupled to the plasma generating electrodes, wherein one of the plasma generating electrodes separates the plasma generating chamber from the substrate processing chamber and the plasma vent is formed at the one of the plasma generating electrodes (for a complete description of the apparatus see abstract and fig. 3 and its description).

Canon does not expressly disclose that the apparatus further comprises electrodes which are disposed so as to interpose a plasma flow spurted out from the plasma vent therebetween, and provided in and between the vicinity of the plasma vent and the vicinity of the substrate supporting table. Hitomi et al. discloses a processing apparatus in which a thin porous metal plate is provided between an active space and a processing space in order to prevent damage to the substrate caused by ion collisions and neutralizing charged particles with good controllability by applying a voltage to the thin porous metal plate (see page 2, lower right column, lines 6-20; page 4, lower right column, lines 5-9; page 5, lower left column, lines 6-13; and figs. 1 and 2). Also, Takahiro et al. describes selectively applying neutral radicals to a substrate by providing a plasma blocking mesh electrode on the surface of the substrate and applying a positive voltage to eliminate positive ions (see page 3, lower left column, lines 15-20; page 4, lower right column, line 20 to page 5, upper left column, line 1; and fig. 1). Therefore, in view of these disclosures, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of

Canon as to further comprise the claimed electrodes structure in order to prevent damage to the substrate by charged particles.

With respect to the shape of the plasma vent having a circular section (claim 10) or having a slit shape (claim 11), the configuration of the claimed plasma vent is a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed container is significant (see *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966)).

Also, Canon does not expressly disclose applying electrical potential to the substrate, but Takahiro et al. discloses coupling of DC potential to the substrate in order to apply bias power (see page 4, last paragraph of lower left column). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Canon as to further apply electric potential to the substrate in order to apply bias power to the substrate. Furthermore, it should be noted, that it is common knowledge in the art that applying bias power to the substrate allows for the regulation/control of ions being directed to the substrate.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Canon, JP 63-255373 in view of Hitomi et al., JP 3-158469 and Takahiro et al., JP 63-286570 as applied to claims 1, 5, 7 and 10-12 above, and further in view of Collison et al., U.S. Patent 6,203,657.

Canon, Hitomi et al. and Takahiro et al. are applied as above but do not expressly disclose that the raw gas-inlet defines an opening on a side face of the

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plasma vent. Collison et al. discloses a plasma apparatus in which a plasma generation chamber and a substrate processing chamber communicate with each other through a plasma vent 208, and wherein a side face of the plasma vent has an opening 222 defining a gas inlet through which gas is introduced (see fig. 3). Therefore, in view of this disclosure, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Canon modified by Hitomi et al. and Takahiro et al., as to comprise a gas inlet defining an opening on a side face of the plasma vent in order to inject additional gas(es) into the substrate processing chamber without having the additional gas(es) flow through the plasma generating chamber.

Claims 1, 5, 7 and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zarowin et al., U.S. Patent 5,290,382 in view of Hitomi et al., JP 3-158469 and Takahiro et al., JP 63-286570.

Zarowin et al. shows the invention substantially as claimed including a surface treatment apparatus for generating plasma by plasma generating electrodes 24 in a casing having said plasma generating electrodes, a raw gas inlet 14 and a substrate supporting table; the casing is partitioned into two chambers, a plasma generating chamber 12 provided with the plasma generating electrodes and a substrate processing chamber provided with the substrate supporting table; the substrate processing chamber communicates with the plasma generating chamber through at least one plasma vent 16 having an orifice or nozzle shape; high frequency electric power source 22 is coupled to the plasma generating electrodes, wherein one of the plasma

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generating electrodes separates the plasma generating chamber from the substrate processing chamber and the plasma vent is formed at the one of the plasma generating electrodes (for a complete description of the apparatus see column 4-line 59 to page column 5-line 6, and fig. 2).

Zarowin et al. does not expressly disclose that the apparatus further comprises electrodes which are disposed so as to interpose a plasma flow spurted out from the plasma vent therebetween, and provided in and between the vicinity of the plasma vent and the vicinity of the substrate supporting table. Hitomi et al. discloses a processing apparatus in which a thin porous metal plate is provided between an active space and a processing space in order to prevent damage to the substrate caused by ion collisions and neutralizing charged particles with good controllability by applying a voltage to the thin porous metal plate (see page 2, lower right column, lines 6-20; page 4, lower right column, lines 5-9; page 5, lower left column, lines 6-13; and figs. 1 and 2). Also, Takahiro et al. describes selectively applying neutral radicals to a substrate by providing a plasma blocking mesh electrode on the surface of the substrate and applying a positive voltage to eliminate positive ions (see page 3, lower left column, lines 15-20; page 4, lower right column, line 20 to page 5, upper left column, line 1; and fig. 1). Therefore, in view of these disclosures, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Zarowin et al. as to further comprise the claimed electrodes structure in order to prevent damage to the substrate by charged particles.

With respect to the shape of the plasma vent having a circular section (claim 10) or having a slit shape (claim 11), the configuration of the claimed plasma vent is a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed container is significant (see *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966)).

Zarowin et al. does not expressly disclose applying electrical potential to the substrate, but Takahiro et al. discloses coupling of DC potential to the substrate in order to apply bias power (see page 4, last paragraph of lower left column). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Zarowin et al. as to further apply electric potential to the substrate in order to apply bias power to the substrate. Furthermore, it should be noted, that it is common knowledge in the art that applying bias power to the substrate allows for the regulation/control of ions being directed to the substrate.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zarowin et al., U.S. Patent 5,290,382 in view of Hitomi et al., JP 3-158469 and Takahiro et al., JP 63-286570 as applied to claims 1, 5, 7 and 10-12 above, and further in view of Collison et al., U.S. Patent 6,203,657.

Zarowin et al., Hitomi et al. and Takahiro et al. are applied as above but do not expressly disclose that the raw gas-inlet defines an opening on a side face of the plasma vent. Collison et al. discloses a plasma apparatus in which a plasma generation chamber and a substrate processing chamber communicate with each other through a

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plasma vent 208, and wherein a side face of the plasma vent has an opening 222 defining a gas inlet through which gas is introduced (see fig. 3). Therefore, in view of this disclosure, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Zarowin et al. modified by Hitomi et al. and Takahiro et al., as to comprise a gas inlet defining an opening on a side face of the plasma vent in order to inject additional gas(es) into the substrate processing chamber without having the additional gas(es) flow through the plasma generating chamber.

Response to Arguments

Applicant's arguments with respect to claims 1, 5, 7-8 and 10-12 have been considered but are moot since the specification, as originally filed, fails to provide support for the newly added limitation of the electrodes being disposed for not disturbing the plasma flow.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luz L. Alejandro whose telephone number is 571-272-1430. The examiner can normally be reached on Monday to Thursday from 7:30 to 6:00.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory L. Mills can be reached on 571-272-1439. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.



Luz L. Alejandro
Primary Examiner
Art Unit 1763

January 25, 2004